YAKIMA CHIEF HOPS®

CRYO HOPS®

PRODUCT DATA SHEET

PACKAGED BY

Yakima Chief Hops
306 Division Street, Yakima, WA 98902 USA
Phone (509) 456-4792, Fax (509) 453-1551

DESCRIPTION

Cryo Hops pellets are produced from whole leaf hops using Yakima Chief Hops' proprietary cryogenic separation process that preserves all components of each fraction. Cryo Hops pellets are the purified lupulin powder containing most of the resin compounds and aromatic oils derived directly from whole hop flowers. It is ideal for use in the whirlpool or fermenter for imparting intense hop flavor and aroma with minimal vegetal flavor and improved yield. Used in combination with CO_2 hop extract, Cryo Hops pellets can add hop aroma and flavor to the end of boil or in dry hopping for a twofold approach to achieving superior brewery efficiency without sacrificing flavor. Depending on how much pellet or whole leaf is replaced by either of these products, breweries may see significant improvements in beer yield which contribute to both the bottom line and sustainability mission of Yakima Chief Hops and many of our customers.

PACKAGING & STORAGE

Cryo Hops pellets are packaged inside polyethylene pouches and/or metallic polyester foils ranging from 11lb (5kg) to 44lb (20kg) capacities and shipped in cardboard cartons. Packaging is done with a nitrogen flush under inert atmosphere. Cryo Hops pellets are packaged based on kg net weight or kg alpha acids. A complete list of packaging information can be obtained upon request. Cryo Hops pellets should be stored near-freezing, preferably between 30°F and 35°F (-1°C and 2°C). Under these conditions, Cryo Hops pellets will remain stable in closed containers for three (3) years in nitrogen flushed, vacuum sealed packaging. Storage stability does vary per variety and can be negatively affected by exposure to oxygen, heat and/or light.

APPLICATION AND USAGE

Cryo Hops pellets may be used anywhere T-90 hop pellets can be used and are best used for late kettle and dry hop additions. As a starting point for recipe formulation or modification dose rate is estimated at 50% of pellets by weight. It is best used in beers defined by their hop flavor and aroma with hop loads of at least 1 lb/bbl in late kettle or dry hop additions where a larger yield increase will occur from substituting out pellets or whole leaf.

ADDITION	CURRENT RECIPE	CRYO HOPS®
60 or 90 Minutes	CO_2 Hop Extract / Hop Pellets	CO_2 Hop Extract / Hop Pellets
15 Minute	Hop Pellets	Hop Pellets
Whirlpool	1 lb / bbl Pellets	0.5 lb / bbl CRYO HOPS®
Dry Hop	1 lb / bbl Pellets	0.5 lb / bbl CRYO HOPS®

An example substitution for a Double IPA hop bill. Actual data will vary per brewery and beer recipe.

YAKIMA CHIEF HOPS®

CRYO HOPS®

SPECIFICATION SHEET

PACKAGED BY

Yakima Chief Hops
306 Division Street, Yakima, WA 98902 USA
Phone (509) 457-3200

DESCRIPTION	METHOD	TYPICAL ANALYSIS
Alpha Acids*	UV Spectro. by ASBC HOPS-6A, LCV by EBC 7.5 HPLC by EBC 7.7 (ICE-3 Std.)	5 - 30% (w/w)
Beta Acids*	UV Spectro. by ASBC HOPS-6A, HPLC by EBC 7.7 (ICE-3 Std.)	4 - 15% (w/w)
Hop Storage Index	ASBC HOPS-12	Varies by variety & time from harvest
Lead		< 0.6 ppm
Arsenic		< 0.4 ppm
Cadmium		< 0.1 ppm
Mercury		< 0.05 ppm
Total Heavy Metals (as Pb eq.)		< 10 ppm
Pesticides	Comply with US Regulations & EC Directive 396/2005 Amendments	

** NOTE: Concentration dependent upon variety of hops and crop year*

YAKIMA CHIEF HOPS®

CRYO HOPS®

SAFETY DATA SHEET

1. PRODUCT IDENTIFICATION

1.1 Product Name	Cryo Hops® Cryo®, (Concentrated Hop Powder) Made from dried and ground hop cones
1.2 Supplier	Yakima Chief Hops Inc. 306 Division St. Yakima, WA 98902 (USA) Phone: +1.509.457.3200 Email: quality@yakimachief.com Website: yakimachief.com
1.3 Recommended Use	Ingredient used in brewing beer.
1.4 Restrictions on Use	None

2. HAZARD IDENTIFICATION

2.1 Hazard Classification	Not Applicable Product is natural, unrefined and contains no additives.
2.2 Label Elements	Not Applicable
2.3 Other Hazards	Dust may be a mild irritant to the eyes. Prolonged skin contact could cause dermatitis in some individuals. Dust generated during sweeping of spilled product may cause severe respiratory distress in some individuals.

3. COMPOSITION, INGREDIENT INFORMATION

3.1 Composition	A fine powder or pellet composed of ground hops, produced by milling and sieving, dried, hop cones
3.2 Hazard Components	Not Applicable Product is natural, unrefined and contains no additives.

4. FIRST AID MEASURES

4.1 Oral Ingestion	Not Applicable
4.2 Eye Contact	Wash with copious amounts of water. Seek medical attention if irritation persists.
4.3 Skin Contact	Wash with warm, soapy water. Seek medical attention if irritation persists. Launder contaminated clothing before reuse.
4.4 Inhalation	Remove affected person to fresh air. Administer oxygen if necessary.
4.5 Symptoms	None Known

5. FIRE FIGHTING MEASURES

5.1 Extinguishing Media	Water, CO2
5.2 Hazards from Fire	None Known

6. ACCIDENTAL RELEASE MEASURES

6.1 Procedure	Scoop, shovel spilled material into recovery container. Flush area with hot soapy water to remove final traces.
6.2 Protective Equipment	Use adequate ventilation or a respirator if in a confined area. Use rubber gloves. Wear Safety Glasses.

7. HANDLING AND STORAGE

7.1 Handling Equipment	Closed Container of Food Grade Quality. Stainless Steel, Lacquered Steel, Laminated Aluminum Foils or PET Pouches.
7.2 Precautions	Avoid generating excessive dust and prolonged skin contact. Use personal protective equipment (Section 8)
7.3 Storage Conditions	Store in dry, odor free environment at temperature range of -1°C to 2°C (30°F to 35°F). Prolonged exposure to high temperatures may cause foils to burst and reduced quality.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

8.1 Permissible Exposure Limits (PELs)	Not Applicable
8.2 Threshold Limit Values (TLVs)	Not Applicable
8.3 Engineering Controls	Provide adequate ventilation
8.4 Personal Protective Equipment (PPE)	Skin Protection: wear rubber gloves if prolonged exposure Eye Protection: wear safety glasses Respiratory Protection: wear face mask if dust will be generated

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance & Odor	Yellow, green or brown powder with an herbal, pungent odor.
9.2 Odor	Hoppy, depends on variety
9.3 Odor Threshold	No data available
9.4 pH	No data available
9.5 Freezing Point	No data available
9.6 Boiling Point	No data available
9.7 Flash Point	No data available
9.8 Evaporation Point	No data available; Solid
9.9 Flammability	No data available
9.10 Upper/Lower Flammability	No data available
9.11 Vapor Pressure	No data available; Solid
9.12 Vapor Density	No data available; Solid

9.13 Density	Varies with production parameters
9.14 Solubility in Water	Insoluble
9.15 Partition coefficient	No data available
9.16 Auto-ignition Temperature	No data available
9.17 Decomposition Temperature	No data available
9.18 Viscosity	Not Applicable; Solid

10. STABILITY AND REACTIVITY

10.1 Reactivity	Product is sensitive to oxidation in open containers in absence of inert atmosphere an/or under excessive temperatures
10.2 Stability	Product is stable under appropriate storage conditions, in closed containers and/or under inert atmosphere. (Section 7.3)
10.3 Possibility of Hazardous Reactions	None known
10.4 Conditions to Avoid	See Section 7.3
10.5 Incompatible Materials	None Known
10.6 Hazardous Decomposition Products	None Known

11. TOXICOLOGICAL INFORMATION

11.1 Acute Toxicology	None Known. Product is "Generally Recognized As Safe" (GRAS 21 CFR 182.20)
11.2 Routes of Exposure	Inhalation: No data available Ingestion: No data available Skin contact: No data available Eye contact: No data available
11.3 National Toxicology Program	Not listed on Report of Carcinogens

12. ECOLOGICAL INFORMATION

12.1 Toxicity	No data available
12.2 Potential for Persistence and Degradation	No data available. Product is all natural and biodegradable.
12.3 Bioaccumulation	No data available. Product is all natural.
12.4 Mobility in Soil	No data available
12.5 Other Effects	No data available

13. DISPOSAL CONSIDERATIONS

13.1 Product Disposal	According to regulations in force.
13.2 Packaging Disposal	According to regulations in force; for paper/cardboard, steel and PET.

14. TRANSPORTATION INFORMATION

14.1 UN Number	Non-hazardous product
14.2 Shipping Name	Cryo Hops
14.3 Hazard Class	Non-hazardous product
14.4 Packing Group	Non-hazardous product
14.5 Environmental Hazards	Non-hazardous product
14.6 Other	Product is not classified as ADR and should not be transported along with ADR classified Cargo. Product should be stored away from engines or any heat source during transportation.

15. REGULATORY INFORMATION

15.1 Regulations	Food Safe Heavy Metals, Pesticides/Herbicides/Fungicides, Nitrates, Radioactivity: Below tolerance levels. Allergenic-Free, Non GMO, Traceable
15.2 REACH	Not Applicable (No EINECS Ref.)

16. OTHER INFORMATION

16.1 Safety Data Sheet Issue Date	2015-11Nov-10
16.2 Safety Data Sheet Revision Date	2025-12Dec-08
16.3 Safety Data Sheet Other	Safety Data Sheet reviewed 2025-12Dec-08